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(56) Documents Cited

GB 2133358 A US 4087107 A US 4054300 A
US 3605929 A

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(54) Motorised personal transport vehicle

(57) The vehicle transports a person sitting or standing for many miles and is usable in all pedestrian areas. It will climb a 1:4 gradient and can tow a trailer. The multi-directional drive/steering unit 11/12 is rotatable through 360° giving immediate motion in any horizontal direction. A stabilising system, which may comprise a pivot 14 with fore-and-aft axis to enable the handlebars to lean, greatly reduces the likelihood of the rider and vehicle becoming unstable while traversing lateral slopes. The vehicle has simple fold-away features with no separation of parts and is light enough to be carried upstairs, lifted into a car, bus or aircraft or pulled along on its rear wheels. It can be stood on-end for space saving. The self-contained drive/steering unit can be attached, via a simple bracket, to other lightweight unpowered mobile devices to give similar powered and steering features or be a powered unicycle. These general features can be packaged in several forms.

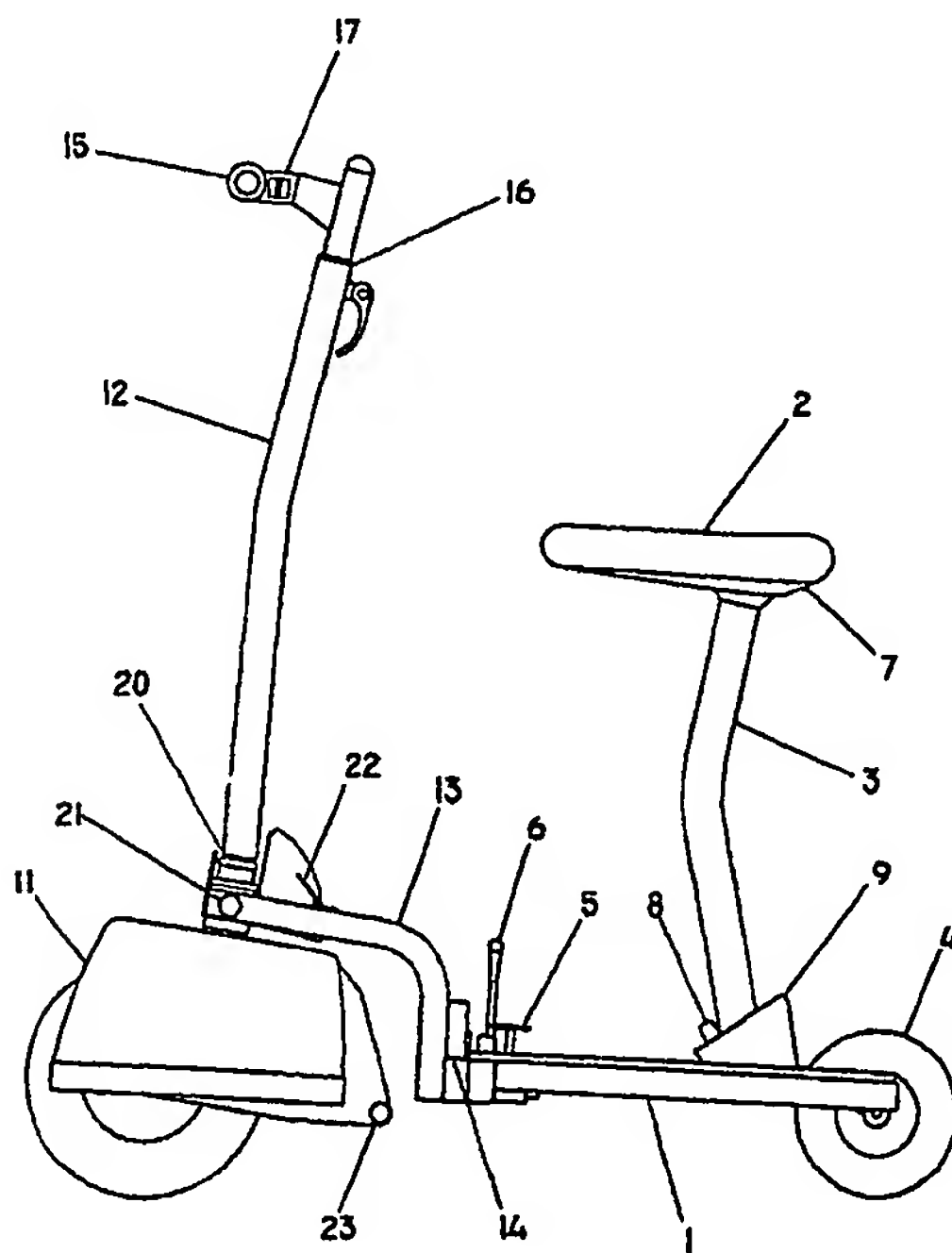


FIG. 1

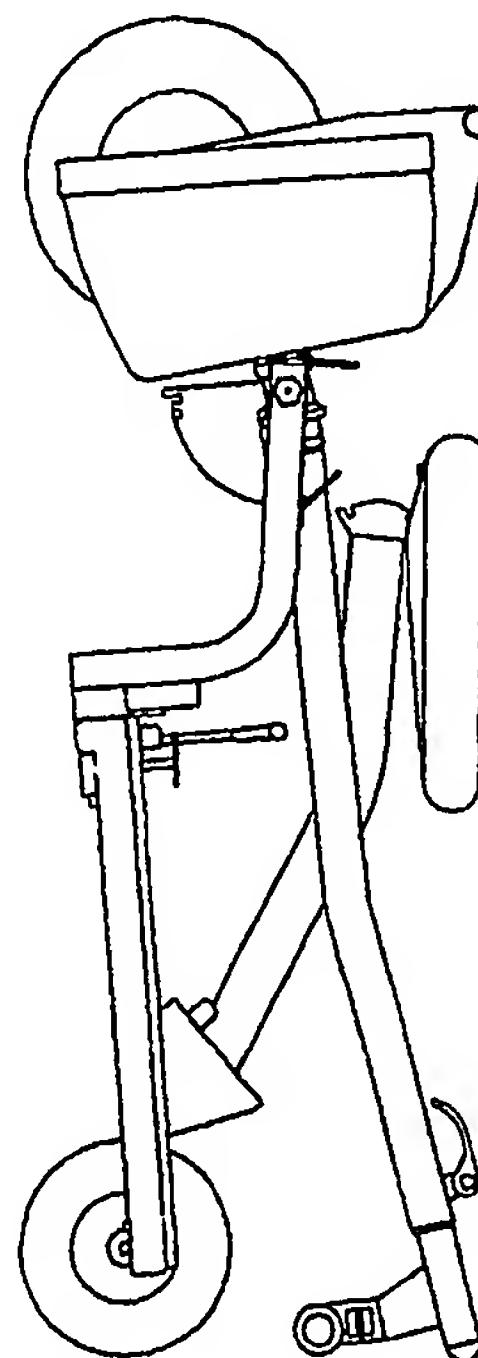


FIG. 5

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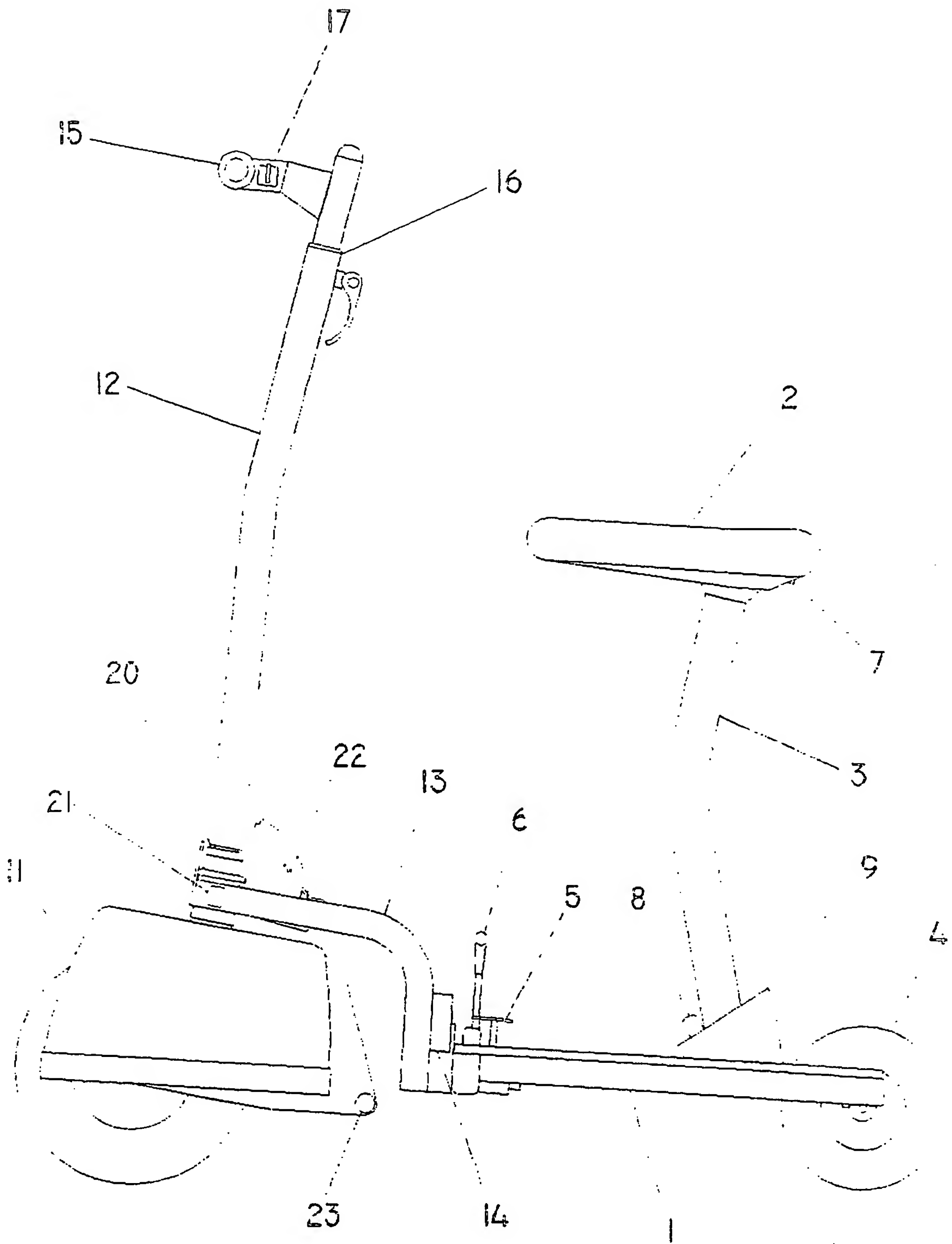


FIG. 1

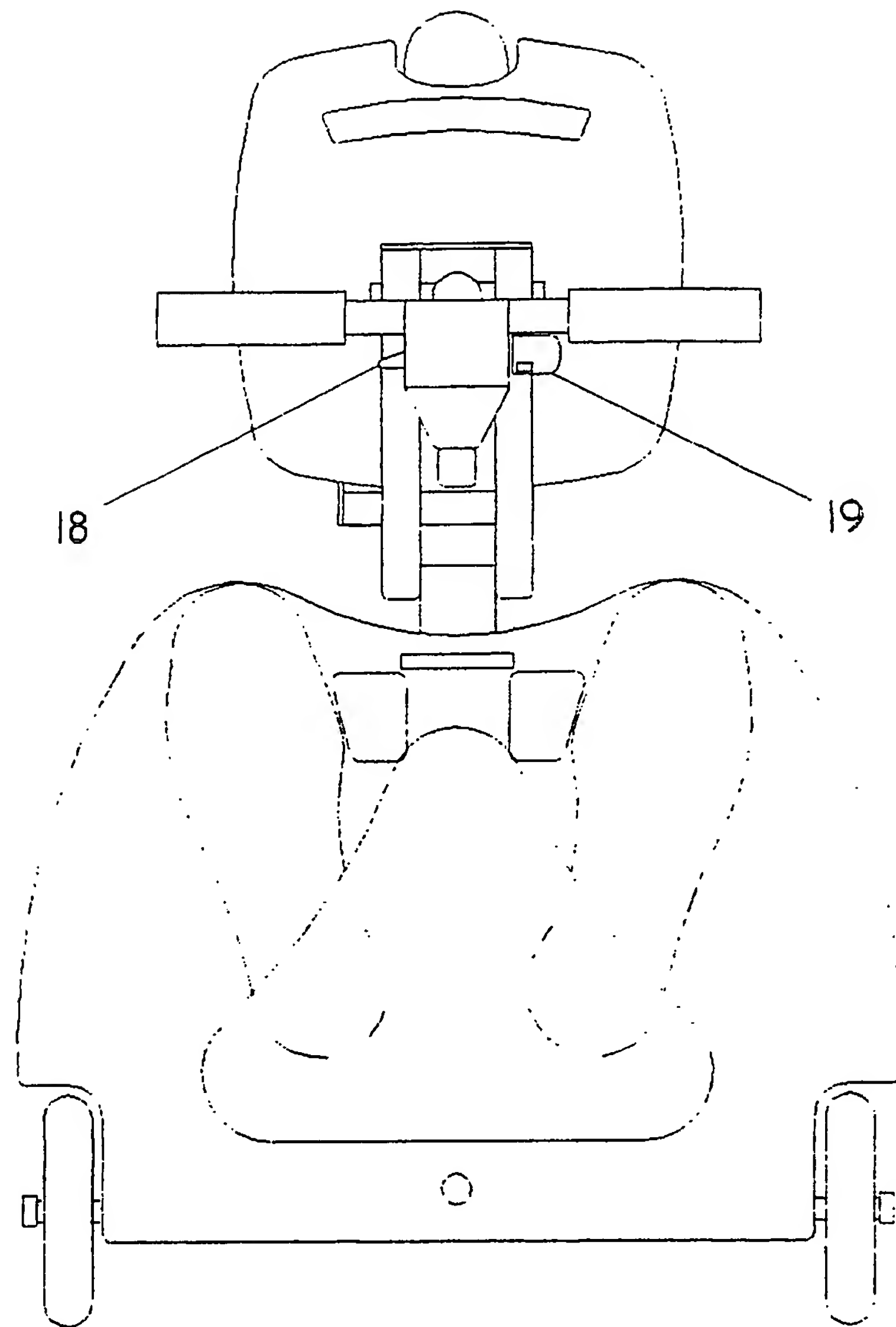


FIG. 2

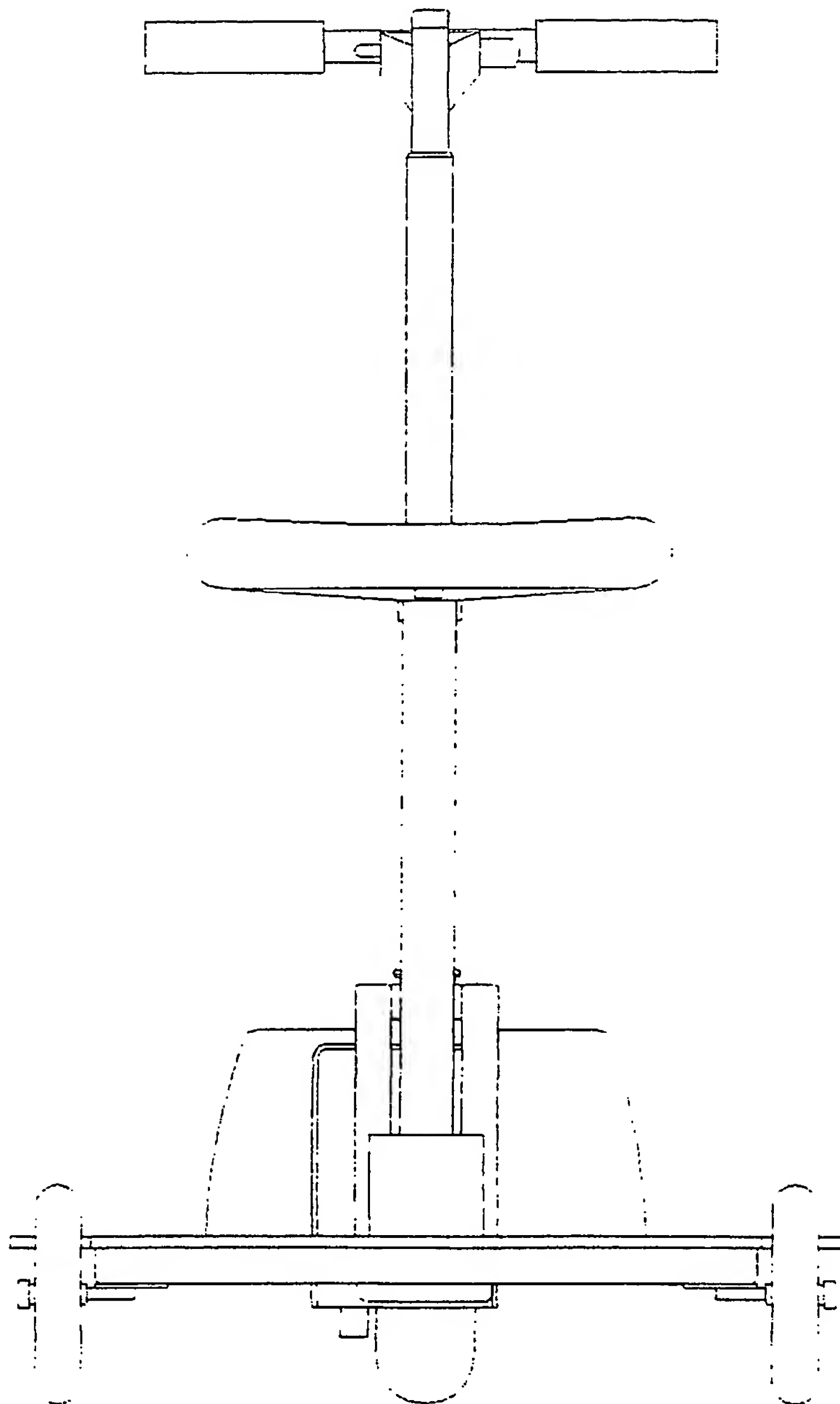


FIG. 3

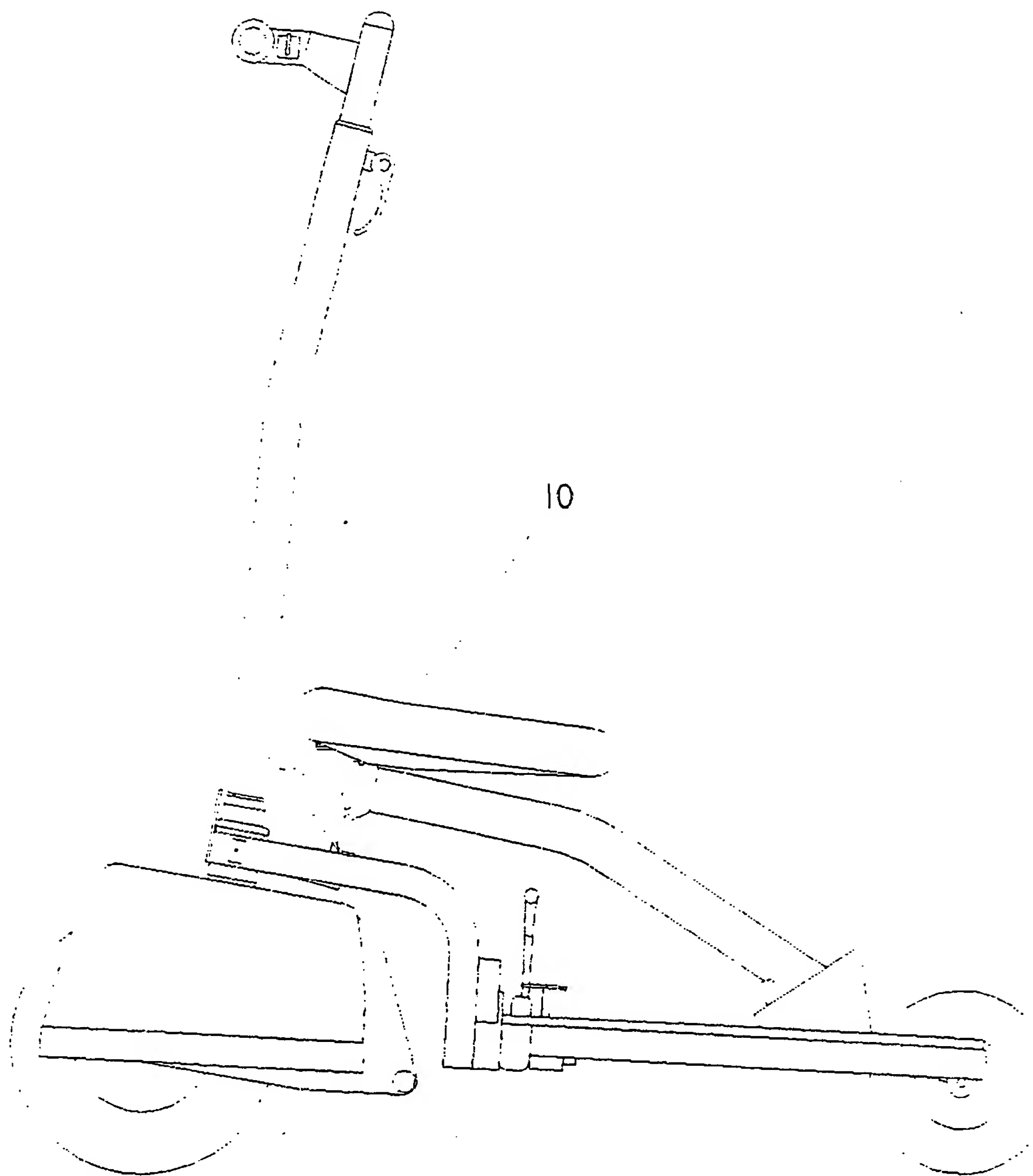


FIG. 4

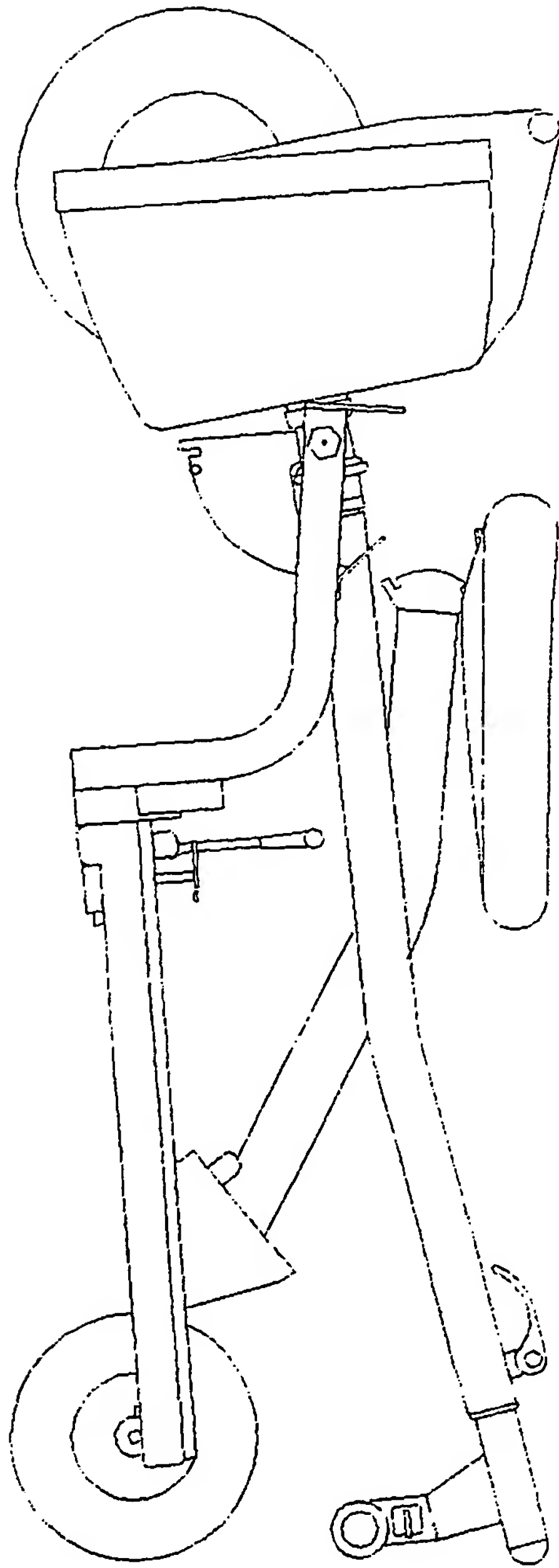


FIG.5

MOTORISED PERSONAL TRANSPORT

This invention relates to a powered vehicle.

Numerous forms of powered vehicle are available and this invention is in addition to those because of certain differences in its design, control and capabilities. It is usable in all pedestrian areas both indoors and outside by the general public including children and persons with walking and distance difficulties. This vehicle is not suitable for disabled persons who need disability vehicles.

This invention is a powered vehicle that will transport a person sitting or standing for many miles and it is usable in all pedestrian areas. It will climb a 1:4 gradient and can tow a trailer. The multi-directional drive/steering unit is rotatable through 360° giving immediate motion in any horizontal direction. A stabilising system greatly reduces the likelihood of the rider and vehicle becoming unstable while traversing lateral slopes. The vehicle has simple fold-away features with no separation of parts and is light enough to be carried upstairs, lifted into a car boot, bus or aircraft or pulled along on its rear wheels. It can be stood on-end for space saving. The self-contained drive/steering unit can be attached, via a simple bracket, to most lightweight unpowered mobile devices to give similar powered and steering features or be a powered unicycle. These general features can be packaged in several forms. One form which the vehicle could take is described in detail herewith with the accompanying drawings in which:-

Figure 1 shows the view on the left-hand side of the vehicle in the standard 'seated rider' configuration.

Figure 2 is the plan view for the seated rider, the foot positions shown are the same for both the seated and the standing rider.

Figure 3 shows the rear view set-up for the seated rider.

Figure 4 is the same as Figure 1 but shows the seat folded away for the 'standing rider'.

Figure 5 illustrates the fully folded vehicle for minimum stowage space and ease of carrying. This is also the pulling mode when the front of the vehicle is lifted to hand height.

Referring to the drawings, the vehicle consists of a platform 1 on which the rider may stand and a seat 2 mounted on a column 3 which is fitted to the platform. Two wheels 4 support the rear of the platform, each of which has a brake connected to its own separate brake pedal 5 at the front of the platform adjacent to the rider's feet. A handbrake 6 is fitted here and operates both brake pedals at the same time. The saddle has an engage-and-release spring latch 7 to permit pivoting downwards. The saddle column has a similar latch 8 to permit rotation in line with the top face of its angled mounting bracket 9. These combined features enable the seat/column unit to be rotated to a position 10 forward of the rider's legs to avoid obstruction when the rider is standing. This is also the seat stowage position when the vehicle is folded.

The drive 11 and the steering 12 assembly is mounted forward of the platform and is connected to the platform via a pair of shaped tubes 13 and a variable geometry pivot 14. The pivot allows the drive/steering unit and the tubes move laterally, i.e. left to right across the longitudinal axis of the vehicle. This feature greatly reduces the likelihood of the rider and vehicle becoming unstable while traversing lateral slopes, by allowing the rider to apply 'lean' to the handlebars 15 to maintain balance. When the 'lean' is released by the rider the pivot mechanism automatically returns the drive/steering unit to the upright position by one of the three methods described in the following:-

- Method A The two tubes 13 are connected to the platform by a large bolt running fore and aft, the bolt is welded to the tubes and tensioned against the platform with a heavy duty spring, this allows free movement laterally and tensioned movement longitudinally. Captivated within the bolt spring assembly is a 'V' dished disc against which two housed steel balls ride up the sides of the 'V' shape against the pressure of the large spring and then settle back into the base of the 'V' when the 'lean' is released.
- Method B The two tubes 13 are connected to the platform by a large bolt and tightened just sufficiently to allow rotation around the bolt axis. A rubber bush is positioned off-centre from the bolt and is distorted by a lever when 'lean' is applied, and reforms when the 'lean' is released.
- Method C The same as in Method B except that the rubber bush is replaced by a spring.

In each of the three methods above, the platform and rear wheels always stay in their normal position in relation to the ground.

The steering column is adjustable in height 16 telescopically for variation in sitting and standing positions. The column is capped with a rubber bush which becomes a foot when the vehicle is folded. The handlebars 15 are attached to the steering column via a control panel 17 which contains a three position switch for:-
BATTERY 1 . . .for outward journey
POWER OFF and CHARGE.
BATTERY 2 . . .for return journey.

The control panel also contains the motion control for the vehicle which is a knob 19 rotated by the right thumb operating a switch potentiometer. All control wires are housed within the steering column as a sleeved 'curly-cord' and pass through the centre of the bicycle-type steering head 20 to the drive unit, consequently there is no distortion of control cables when the steering is rotated round and round.

The steering head is located between the tubes 13 and is attached to them via a pivot bolt 21 on each side. This pivot allows the drive/steering unit the choice of two positions. One is the upright mobile position as depicted in Figures 1 to 4, and the other is the folded position as shown in Figure 5. These two positions are engaged and released by a spring latch 22.

The drive/steering unit must be rotated through 180° prior to folding down to achieve the correct folded position.

The electric motor, batteries, reduction gears and the front wheel are all housed in the drive unit 11 beneath the steering-head. This drive/steering concept allows unrestricted rotation of the steering, giving the vehicle motion in any desired direction including backwards, without the need for reverse gears. Manoeuvrability is therefore infinite in horizontal directions.

- The action of folding the vehicle brings the pulling handle into the required accessible position for picking up the front of the vehicle and pulling it along on its rear wheels. Brackets and fittings are located appropriately for all the necessary ancillaries such as shopping basket, lamps, reflectors, walking stick, umbrella, charger, lock, towing attachment and the like.

The vehicle construction is of lightweight materials where possible such as aluminium and plastic and the total is sufficiently light in weight to be carried up a stairway in one piece.

When folded it can stand on end for space saving.

The self-contained drive/steering unit is easily removable by unscrewing the two pivot bolts 21. The assembly can then be attached, by a simple bracket, to other lightweight unpowered mobile devices to give them similar powered and steered features. A seat could be attached to the drive steering unit to create a powered unicycle.

CLAIMS

1 A powered vehicle that will transport a person sitting or standing for many miles and it is usable in all pedestrian areas. It will climb a 1:4 gradient and can tow a trailer. The vehicle features a self-contained multi-directional drive steering unit which is rotatable through 360° giving immediate motion in any horizontal direction. A further feature is a stabilising system which greatly reduces the likelihood of the rider and vehicle becoming unstable while traversing lateral slopes. The vehicle has simple fold-away features with no separation of parts. It is light enough to be carried or pulled along on its rear wheels and can be stood on-end for space saving. These general features can be packaged in several forms.

2 The self-contained drive steering unit can be detached by removing two bolts and then attached, via a simple bracket, to other lightweight unpowered mobile devices to give them similar powered and steering features.

3 The self-contained drive steering unit can be detached by removing two bolts and then fitted with a seat and footrests to become a powered unicycle.

**Examiner's report to the Comptroller under Section 17
(The Search report)**

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Relevant Technical Fields

(i) UK Cl (Ed.M) B7H (HC)

(ii) Int Cl (Ed.5) A61G 5/04; A63B 55/08; B62D 1/14, 9/02,
21/18, 51/00, 61/08 B62K 5/02, 5/04, 5/06,
11/00, 11/02, 11/12, 11/14

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner
JOHN TWIN

Date of completion of Search
15 NOVEMBER 1994

Documents considered relevant
following a search in respect of
Claims :-
1

Categories of documents

- | | |
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| Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: Document indicating technological background and/or state of the art. | &: Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2133358 A (ELO-MA-HG)	1
X	US 4087107 (WINCHELL)	1
X	US 4054300 (WINCHELL)	1
X	US 3605929 (ROLLAND)	1

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